OM-3230

ONKYO SERVICE MANUAL

STEREO CASSETTE TAPE DECK MODEL TA-2058

Black and silver model

UDN, UDC, UD	120V AC, 60Hz
UG	220V AC, 50Hz
UW	120 or 220V AC, 50/60Hz
UQA, UQB	240V AC, 50Hz

SAFTY-RELATED COMPONETN WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PARTS NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

ONKYO®
AUDIO COMPONENTS

SPECIFICATIONS

Track Format: 4 tracks, 2 channels
Erasing System: AC erase
Tape Speed: 4.8 cm/sec. (1-7/8 i.p.s.)
Wow & Flutter: 0.045% (WRMS)
Frequency Response: 20–17,000Hz (30–16,000Hz ±3dB) (normal position tape)
20–18,000Hz (30–17,000Hz ±3dB) (high position tape)
20–19,000Hz (30–18,000Hz ±3dB) (metal position tape)
Signal-to-Noise Ratio: 60dB (metal position tape, Dolby NR out)
A noise reduction of 10dB above 5kHz and 5dB at 1kHz is possible with Dolby B NR. A noise reduction of 20dB at 5kHz is possible with Dolby C NR.
Input Jacks: Mic jacks: 2
Input sensitivity: 0.6mV/600 ohms
Input impedance 5.6 kohms
Line IN: 2
Input sensitivity: 60mV
Input impedance: 50 kohms
Outputs: Line OUT: 2
Std output level: 500mV (0dB)
Optimum load impedance: over 50 kohms
Headphone Jack: 1

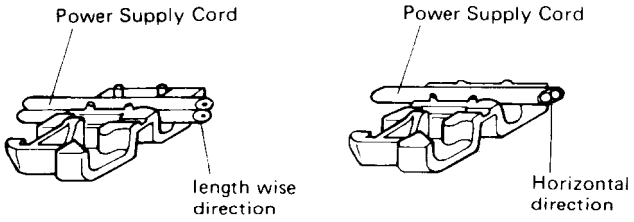
	Optimum load impedance: 8-200 ohms
Motors:	DC servo motor: 1 DC motor: 2
Heads:	REC/PB heads: Special Hard Permalloy Erase head: Ferrite
Power Supply:	AC 120V/60Hz
Power Consumption:	34 watts
Dimensions:	435(W) x 112(H) x 360 (D)mm (17-1/8" x 4-3/8" x 14-1/8")
Weight:	6.1 kg. (13.4 lbs.)

Specifications and external appearance are subject to change without notice because of product improvements.

SERVICE PROCEDURES

1. Replacement of power supply cord

There are two power supply cord outlets on the strainrelief. Insert them in prescribed direction to ensure safety. AS-UC-3 (UD<120V> model) should be inserted lengthwise and other types of cords should be inserted horizontally.



2. Instruction resistance measurement

Connect the insulating-resistance tester between the plug of power supply cord and chassis.
Specifications; 500V more than 10MΩ

3. Replacing the lamps

This unit used the lamps listed below.

Circuit No.	Parts No.	Description
Mechanism 184b	24606173	50mA, 14V. Lamp
PL901	210090	150mA, 14V. Lamp
PL902	210190	60mA, 14V. Lamp

CAUTION: Before replacing the lamps. be sure to unplug the power supply cable.

FEATURSE

Three Heads with Special Hard Permalloy For Superior Metal Tape Performance

Having three heads means you can monitor the actual recorded signal as you record instead of rewinding the tape to check your recording afterward. The 3-head system also has the advantage of making possible the use of separate record and playback gaps, each optimized for its own task. The special hard permalloy head formulation boasts the high saturation flux density and abrasion resistance needed for true metal tape compatibility.

Preset Automatic Accubias

Different brands of cassette tape can exhibit slight variations in playback frequency response even when recorded at exactly the same bias level. Automatic Accubias tailors the recording bias to the magnetic characteristics of any cassette tape. The Auto Accubias preset knob allows you to choose from five different frequency response positions (−2, −1, 0, +1, +2) before the adjustment takes place. The 0 setting results in flat playback response. If you wish to boost high frequencies (when recording electronic music, for example) choose + 1 or + 2; choose − 1 or − 2 to attenuate them. This system combines maximum flexibility with ease of operation.

Dual Sensor Real Time Tape Counter

The tape counter circuit measures the speed of both tape reels and compares them by microcomputer to provide precise readings of remaining time. This dual sensor technique eliminates small errors in time calculations caused by slight variations in tape thickness between different manufacturers to give the most accurate time indications possible.

2-Motor Tape Transport with Separate Head Assembly Motor

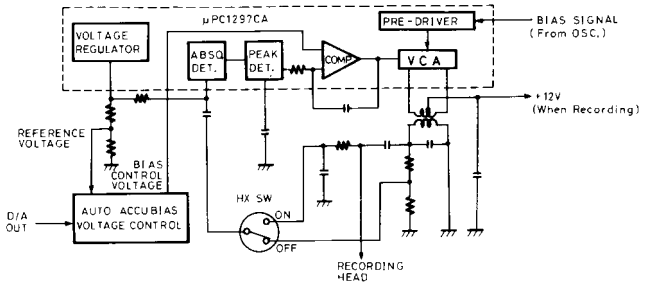
The tape transport system, along with the heads, is the most important factor affecting the basic performance of a cassette deck. To assure extremely stable and accurate transport, this unit uses a DC servo-controlled capstan motor. This motor is unaffected by fluctuations in the power supply voltage and frequency and instantaneous changes in load. A highly reliable simple drive transmission system and precision vertical cassette holder further enhance overall accuracy and stability. As a result, wow and flutter is under 0.045%. In addition, separate DC motors drive the reel tables and head base and the head assembly is constructed to move silently with no annoying clicks.

Dolby B and C Noise Reduction, and Dolby HX PRO

Along with standard Dolby B NR, this unit also has the even more effective Dolby C NR system. Dolby C NR reduces tape background noise by 20dB at 5kHz, about 3 times more than Dolby B NR. In addition to its wide band noise reduction, Dolby C NR uses a sliding band technique that varies the band width of noise reduction according to the input level, thereby avoiding noise "pumping." Dolby C NR also has an anti-saturation effect to reduce the chance of tape saturation in the high range. All these features combine to eliminate the adverse effects on tape sound that other noise reduction systems can cause. This deck also features Dolby HX PRO which helps prevent tape saturation and thereby allows you to record tapes containing a wider dynamic range.

CIRCUIT DESCRIPTIONS

1. DOLBY HX PRO CIRCUIT



In this circuit, the bias oscillates only when recording. The size of the bias current is controlled by the bias control voltage. When the HX PRO is OFF, by means of the recording signal, a non-modulating oscillator voltage is applied to the absolute value detection circuit. When the HX PRO is ON, by means of the recording signal coming from the recording head, a modulating oscillator voltage is applied to the absolute value detection circuit, and by means of the recording signal level peak detection value, the bias current is instantaneously controlled. At such time, by means of the CR integrated circuit, the frequency characteristic is maintained. (Approx. 8KHz)

2. PRESET ACCU BIAS OPERATION

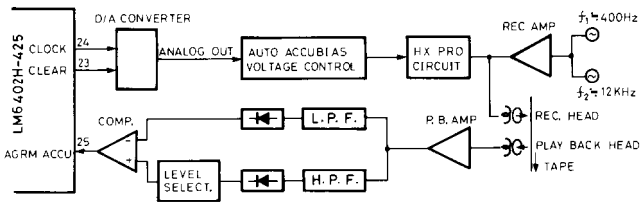


Fig. 1 Block diagram

With the LEVEL SELECT, the 12KHz level is set in 5 stages. With regard to 400Hz, the 12KHz level is set in 5 stages.

When the ACCU BIAS operation is started, a 400Hz/12kHz mixed signal is recorded, the bias current in this case being controlled by a signal from the microcomputer. The play-back signal is separated by filter into the original 400Hz and 12kHz signals, and after being rectified these signals are passed to a comparator where a comparison check is made to see if one of the signals is greater than the other. A HIGH comparator output indicates that the 12kHz signal is greater than the 400Hz signal, and a LOW output indicates that the 400Hz is lower than the 12kHz.

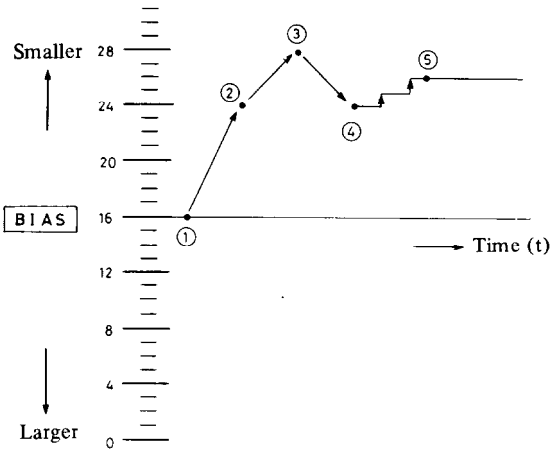


Fig. 2 Bias adjustment method

First the bias is set to step 16 which is in the center of the bias range shown in Figure 2. Then the 400Hz/12kHz mixed signal is subjected to a comparison operation to see which component is larger. If the 12kHz signal is larger, then the bias level is too small. If the 400Hz signal is larger, on the other hand, the bias level is too large. In the example shown in Figure 2, the bias level at step 16 is too large, so the bias is reduced by ¼ of the total range (8 steps) to position (2) where the 400Hz and 12kHz components are again compared. If the 400Hz signal is still larger than the 12kHz signal, the bias level is further reduced by ⅛ of the total (4 steps) (3) and the components then compared again. This procedure is used for rough adjustment of the optimum bias. If at this stage, the 12kHz signal is now found to be greater than the 400Hz signal, the optimum bias is known to exist between steps 24 and 28. The operation is now switched to fine adjustment – the bias is increased by ⅛ and then reduced one step at a time from step 24. The step where the component signal size relationship is switched from 400 > 12k to 12k > 400 is taken as the optimum bias (5), and the bias is set at this level. This fine adjustment operation proceeds only from greater to lower bias levels in order to avoid misoperation due to possible drop outs. The effects of a drop out on the bias adjustment when the bias is changed from a smaller to a larger level is indicated in Figure 3, while the reverse case is indicated in Figure 4.

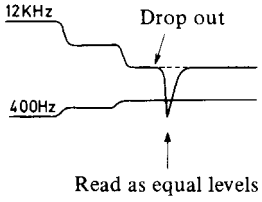


Fig. 3 Example of misoperation caused by drop out

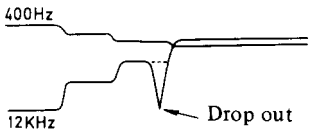


Fig. 4 Example where effect of drop out is avoided

3. DA Converter and Data Setting Method

The D/A converter circuitry is outlined in Figure 5, and the logic diagram of the 4024BP 7-stage binary counter in Figure 6. The 4024BP counter is counted up each time a negative input pulse is applied to the clock pin, the output data being obtained from Q1 thru Q7 (although only Q1 thru Q5 are actually used). This output is converted to an analog quantity when passed through the R–2R rudder resistance circuit.

If the power supply voltage is 5V, the voltage per step is approximately 0.156V with a total of about 4.84V. Since this 4024BP is only involved in up counting, setting to a value lower than the current value (that is, greater bias) results in an initial clearing and output of pulses until the set value is reached.

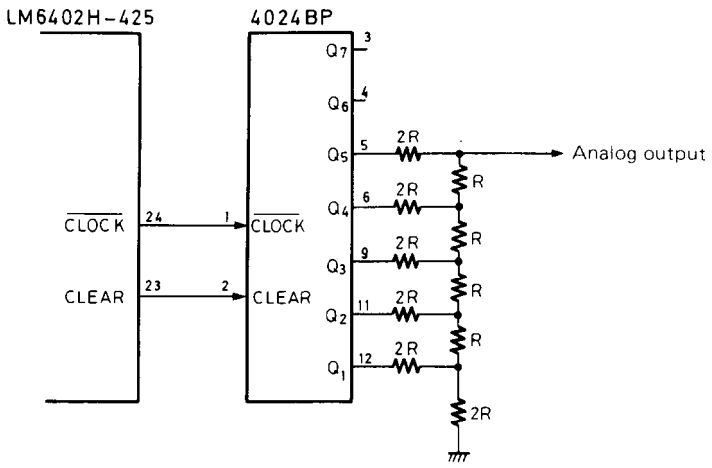


Fig. 5 DA converter circuitry

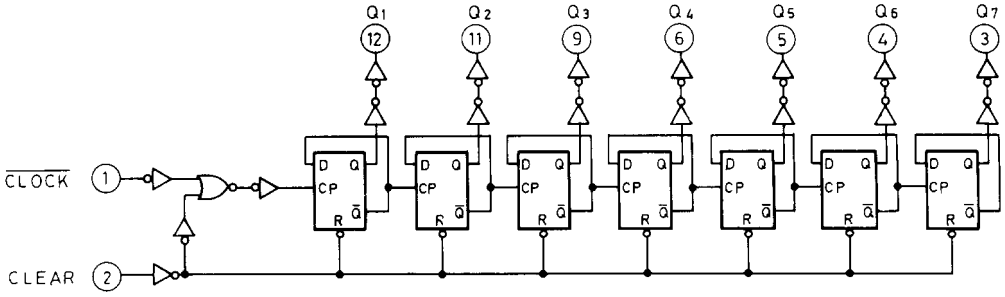


Fig.6 4024BP logic circuit

4. Input Port Expander IC

The equivalent circuit of the LC7800 used to expand input ports is shown in Figure 7. This IC includes four 4-bit input ports, one 4-bit output port, and one 4-bit selector input port. When BA of the selector input is set to LOW and the other bits to HIGH, the A0" A1" A2" A3 input port is connected to the D0" D1" D2" D3 output port. And if only the BB bit is set to LOW, the B0" B1" B2" B3 input is selected. Hence, a LOW level signal is applied to the selector port bits in cyclic order, and the operation indicator LEDs are switched on and off dynamically in combination with the #13, #14, and #15 LED output ports while input port data is being read out.

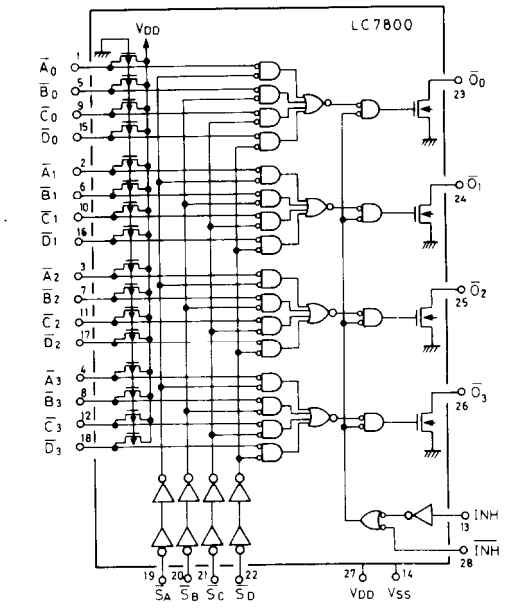
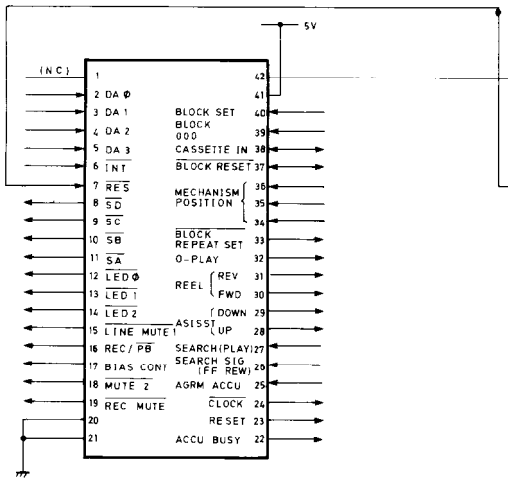


Fig. 7 LC7800 equivalent circuit

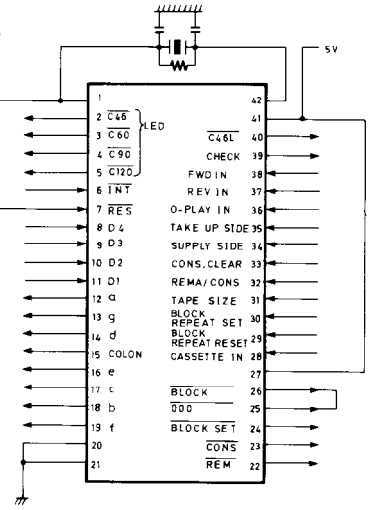
MICROCOMPUTER(LM6402H-425)

Pin no.	Name	Function	Classification
2～5	DA0～DA3	Reading of data from the inport port expander IC	IN
6	$\overline{INT}$	Rotation signal input (for auto-stop operation)	IN
8～11	$\overline{SA}$.～$\overline{SD}$	Input port expander IC and dynamic LED selector IC	OUT
12～14	$\overline{LED0}$～$\overline{LED3}$	Operation display dynamic LED data output	OUT
15	$\overline{LINE\ MUTE\ 1}$	Line muting output signal generated when the power is switched on, and during ACCU BIAS operation.	OUT
16	REC/PB	Output signal for muting DIN outputs when recording	OUT
17	BIAS CONT.	Output signal for control of bias oscillator	OUT
18	$\overline{MUTE2}$	Signal for switching muting off during playback	OUT
19	$\overline{REC.\ MUTE}$	Signal for muting the recording amplifier output	OUT
22	ACCU BUSY	Output signal generated during ACCU BIAS operation	OUT
23			OUT
24			OUT
25			OUT
26	SEARCH SIG (HIGH)	Input signal from high-speed travel tune-selector.	IN
27	SEARCH SIG (LOW)	Input signal from low-speed travel tune-selector amplifier	IN
28	UP	Output signal for driving the assist motor towards the PLAY position.	OUT
29	DOWN	Output signal for driving the assist motor towards the FF/REW position.	OUT
30	FWD	Output signal for driving the reel motor towards the FF position.	OUT
31	REW	Output signal for driving the reel motor towards the REV position.	OUT
32	O-PLAY	Reel motor torgue switching output	OUT
33	$\overline{BLOCK\ SET}$	Output which informs the counter IC that the BLOCK SET key has been pressed.	OUT
34～36	a.b.c	Input ports for signal from the mechanism position switches	IN
37	BLOCK RESET	Output which informs the counter IC that the BLOCK RESET key, or any other key apart from the BLOCK SET key has been pressed.	OUT
38	CASSETTE IN	Input involved in detection of cassette half. and output which stops the capstan motor when an abnormal mechanism status is detected.	I/O
39	$\overline{BLOCK\ MATCHING\ \&\ 000\ INPUT}$	Input of 000 input signal and BLOCK matching signal from the counter IC.	IN
40	$\overline{BLOCK\ SET}$	Input which accepts signals from the counter IC during BLOCK SET.	IN

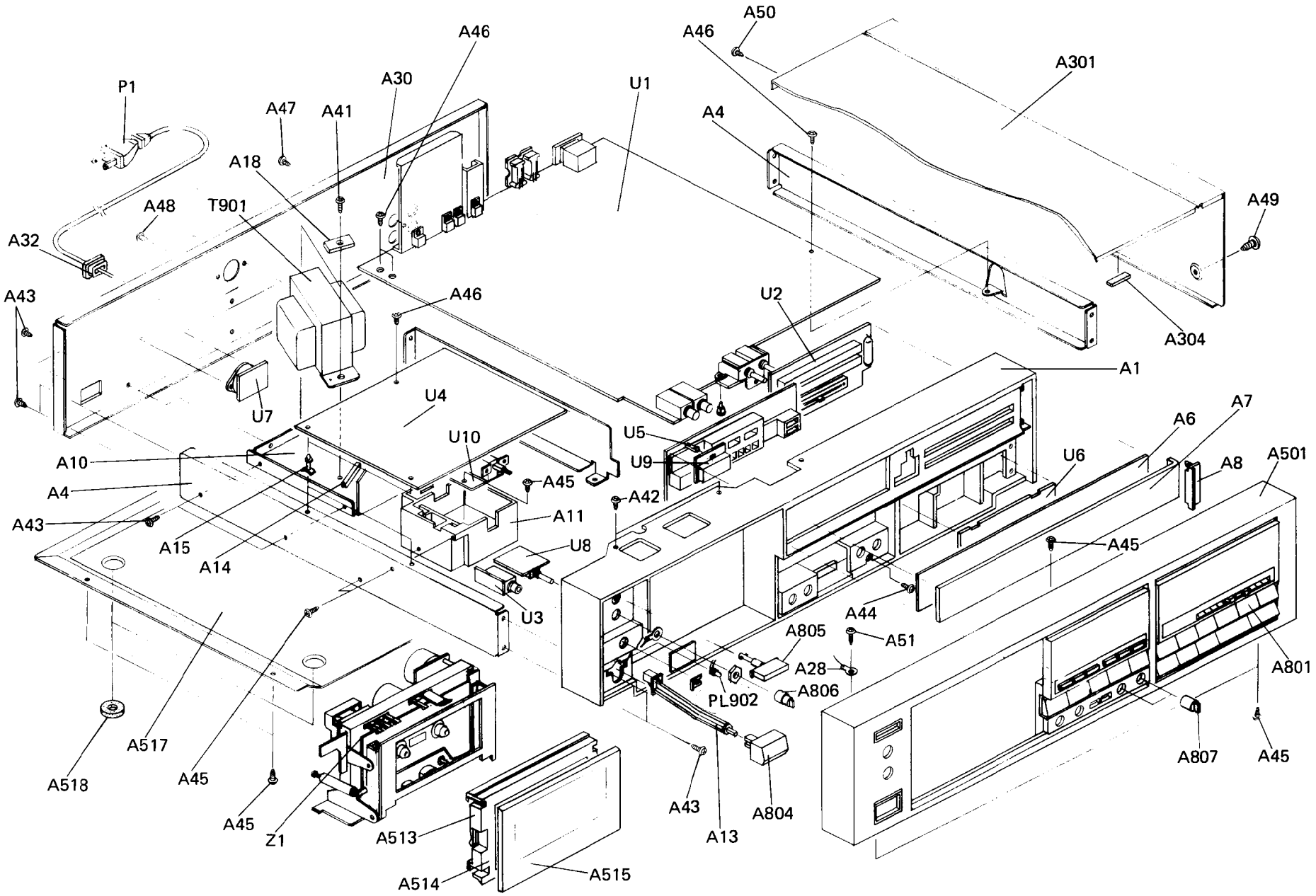
Q701 LM6402H-425



Q702 LM6402H-424



CHASSIS EXPLODED VIEW



CHASSIS EXPLODED VIEW PART LIST

REF. NO.	PART NO.	DESCRIPTION
A1	27110282A	Front bracket
A4	27115205	Side bracket
A6	28133156A	Back plate
A7	28130236A	Dial plate
A8	27190446	Holder
A10	27130331H	Bracket (PT)
A11	27190351-1	Holder (POW)
A13	27273030C	Joint (L)
A14	28170014	Bushing
A15	27190009	Holder
A18	870065	Special washer
A19	86414010	FWN4x10FN, Flange nut
A28	223004-1	Terminal
A30	27120846A	Back bracket (D)
	27120847A	Back bracket (G)
	27120848A	Back bracket (W)
	27120850	Back bracket (Q)
A32	27300750	Strainrelief
A41	830440109	4TTC+10C (BC), Screw
A42	834426068	2. 6TTS+6B (BC), Screw
A43	834430068	3TTS+6B (BC), Screw
A44	82143006	3P+6FN (BC), Screw
A45	833430080	3TTP+8P (BC), Screw
A46	831430088	3TTW+8B (BC), Screw
A47	834430108	3TTW+10B (BC), Screw
A48	82142604	2. 6P+4F (BC), Screw
A49	838440089	4TTB+8C (BC), Screw
A50	838430088	3TTB+8B (BC), Screw
A51	834230108	3TTS+10B (NI), Screw
A301	28184235	Top cover (S)
	28184236	Top cover (B),
A304	28140408	Cushion
A501	15078121	Front panel ass'y (S)
	15068121	Front panel ass'y (B)
A501a	28125133	End cap (L) (S)
	28125135A	End cap (L) (B)
A501b	28125134	End cap (R) (S)
	28125136A	End cap (R) (B)
A501c	27267238A	Guide (EJ) (S)
	27267239A	Guide (EJ) (B)
A501d	27267206B	Guide (POW) (S)
	27267235B	Guide (POW) (B)
A501e	28198577	Facet (POW)
A501f	28191349A	Clear plate
A501g	2726403	Plate
A513	27300697	Cassette lid
A514	27262332	Plate
A515	28191350	Window
A517	27170225A	Bottom board
A518	27175011C	Leg
A801	28322530A	Knob ass'y (S)
	28322531A	Knob ass'y (B)
A804	28321904A	Knob (POW) ass'y (S)
	28321905	Knob (POW) ass'y (B)
A805	28321027B	Knob (EJ) ass'y (S)
	28321988	Knob (EJ) ass'y (B)
A806	28320797	Knob (SEL) (S)
	28321735	Knob (SEL) (B)
A807	28322437	Knob (LEV)
T901	⚠ 230819	NPT-845D, Power transformer (D)
	⚠ 230820	NPT-845G, Power transformer (G)
	⚠ 230821	NPT-845DG, Power transformer (W)
	⚠ 230823	NPT-845Q, Power transformer (Q)
P1	⚠ 253112	AS-UC-4, Power supply card (D)
	⚠ 253128A	AS-CEE, Power supply card (G/W)
	⚠ 253118	AS-SAA, Power supply card (Q)
PL902	210190	14V 60mA, Lamp
S902	⚠ 25065123	ASS-1258P, Voltage selector (W)
Z1	244091	NDM-83, Tapa mechanism ass'y
U1	15078534-1	NAAF-2634-1 (D)
	15078534-1A	NAAF-2634-1A (G/W)
		Main pc board ass'y
U2	15078535-1	NAVR-2635-1
		Peak meter, Volume pc board ass'y
U3	15078536-1	NAHP-2636-1
		Head phone pc board ass'y
U4	15078537-1	NACOC-2637-1
		Control pc board ass'y
U5	15078538-1	NADIS-2638-1
		Display pc board ass'y
U6	15078539-1	NASW-2639-1
		Operation switch pc board ass'y
U7	15078540-1	NARM-2640-1
		Remote control pc board ass'y
U8	15078541-1	NASW-2641-1
		Timer switch pc board ass'y
U9	15078542-1	NALED-2642-1
		Display pc board ass'y
U10	⚠ 15078564-1	NAPS-2664-1
		Power switch pc board ass'y

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CIRTICAL FOR LISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PARTS NUMBER SPECIFIED.

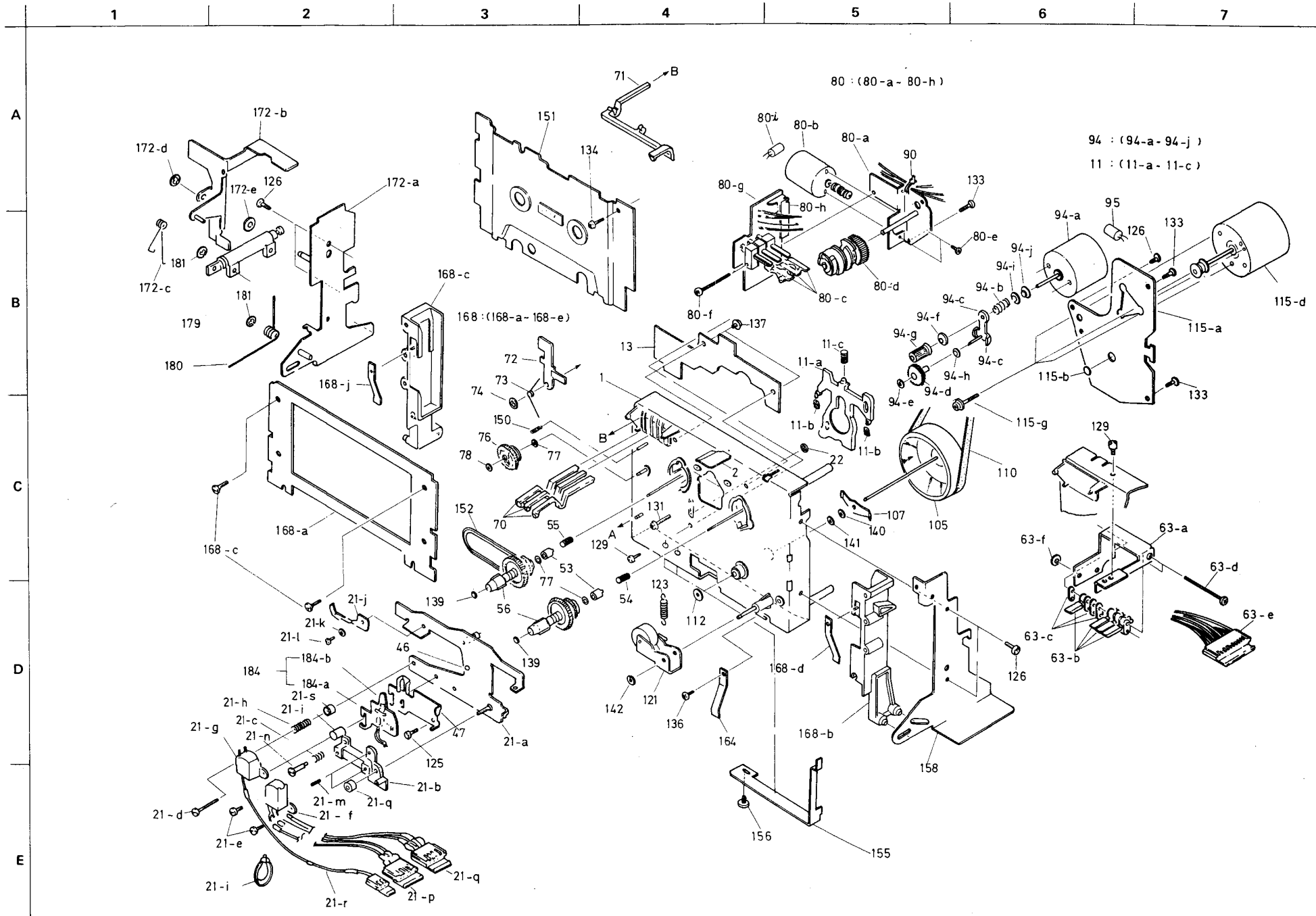
NOTE: (D): Only 120V model
(G): Only 220V model
(W): Only Universal model
(Q): Only 240V model
(S): Only Silver model
(B): Only Black model

TAPE MECHANISM-PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
1	24611042	Chassis
2	24605468	Spring
11	24611043	Brake plate ass'y
11a	24611053	Brake plate
11b	24610999	Brake rubber
11c	24605500	Spring
13	24606204	Sensor pc board ass'y
21a	24611045	Head base
21b	24611046	Head block
21c	24605502	Spring
21d	82512012	2x12mm, Binding screw
21e	801250	2x4mm, Pan head screw
21f	24600037A	Rec/pb. head
21g	24600041	Erase head
21h	24605618	Spring
21i	24611052	Binder
21j	24611054	Stopper
21k	24611055	Washer
21l	82112002	2x2mm, Pan head screw
21m	801251	Screw
21n	24610652	Shaft
21o	24610495	Adjustment nut
21p		Connector ass'y
21q		Connector ass'y
21r		Connector ass'y
21t	24604062	Spacer
22	893030	E3, Circlip
46	24610943	ϕ3mm, Steelball
47	24610963	Plate, head holding
53	24610964	Spring holder
54	24605501	Spring
55	24605505	Spring
56	24602267	Reel stand ass'y
63a	24611056	Plate, switch holding
63b	24606205	Leafswitch
63c	24611057	Washer
63d	82112030	2x30mm, Pan head screw
63e		Connector ass'y
63f	24611058	Washer
70	24603281	Lever, switch
71	24603282	Lever, switch, metal
72	24611049	Plate, lock
73	24605503	Spring
74	891030	CS3, Circlip
76	24601167	Pulley ass'y
77	24611047	2.1x4.5x0.1, Washer
78	24611003	1.8x3.8x0.5, Washer
80	24601212	PAD unit ass'y
80a	24610968	Plate
80b	24601103	Motor PAD
80c	24606182	Leafswitch
80d	24602133	Cam gear
80e	82112003	2x3mm, Pan head screw
80f	833125209	2.5x20mm, Pan head screw
80g	24606181	Pc board
80h	25055106	Post with base
80i	352942206	22μF, 16V, Elect. capacitor
90	24611052	Binder

REF. NO.	PART NO.	DESCRIPTION
94	24601145	Reel motor ass'y
94a	24601054	Reel motor
94b	24605467	Spring
94c	24602235A	Lever ass'y, wheel
94d	24602236A	Wheel
94e	24610969	1.3x3.4x0.5mm, Washer
94f	24610970	Felt
94g	24602237A	Wheel, motor
94h	24610981	1.7x4x0.25mm, Washer
94i	24610374	Washer
94j	24611048	Holder, spring
95	352942206	22μF, 16V, Elect. capacitor
105	24602372	Flywheel
107	24605452	Spring, thrust
110	24602269	Flat belt
112	24610673	Flat washer
115a	24610971	Plate, flywheel
115b	24610671	Holder, thrust
115d	24601202	Motor ass'y, capstan
115g	801338	Pan head screw with washer
121	24602270	Arm, pinch roller
123	24605453	Spring
125	833125069	2.5x8mm, Pan head screw
126	833125059	2.5x5mm, Pan head screw
129	801250	2x4mm, Pan head screw
131	82512614	2.6x14mm, Binding screw
133	833426105	2.6x10mm, Tapping screw
134	833126055	2.6x5mm, Tapping screw
136	837120058	2x5, Truss screw
137	801292	2x3mm, Truss screw
139	24610349	1.8x3.2x0.5mm, Washer
140	24610515	2.6x4.7x0.25mm, Washer
141	24610972	2.6x4.7x0.13mm, Washer
142	24610973	2.7x6x0.5mm, Washer
150	24605481	Spring
151	24611018	Panel ass'y
152	24602271	Belt
155	26411079	Break
156	833130049	Pan head screw
158	24610939	Plate, right side
164	24605188	Spring, cassette
168	24610940	Holder ass'y
168a	24610949	Plate, holder
168b	24610849	Holder, right
168c	24610848	Holder, left
168d	24605463	Spring, cassette
168e	835426082	2.6x8mm, Flat head screw
172a	24611059	Plate, left
172b	24603283	Lever, cancel
172c	24605504	Spring
172d	893030	E3, Circlip
172e	24610452	Flat washer
179	24611051	Damper unit
180	24605456	Spring
181	891024	CS2.4, Circlip
184	24606168	Holder ass'y, lamp
184a	24610498	Holder, lamp
184b	24606173	14V, 50mA, Lamp

TAPE MECHANISM-EXPLODED VIEW

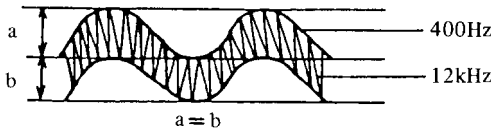


ADJUSTMENT PROCEDURES

	Item	Connection of instrument	Line input	Test tape	Mode	Output indicator	Adjustment point	Adjust	Remarks
1	Tape speed	Frequency counter to LINE output terminal		MTT-111	PB	Frequency counter	Semi-fixed on the motor	3,010 to 3,020Hz	
2	Head azimuth	AC voltmeter and oscillo-scope to LINE output terminal		VTT-658	PB	AC voltmeter	Head azimuth screw	Maximum and same phase at channels L and R	Fig. 1
3	Playback level	AC voltmeter to terminals TP-1 and TP-2		MTT-150	PB	AC voltmeter	R-123 (Ch.L) R-124 (Ch.R)	300mV	
4	Bias current	Fig. 2	1kHz, −20dB and 12kHz, −20dB	NEW XL-II90	REC/PB	AC voltmeter	R-569 (Ch.L) R-570 (Ch.R)	Same level at REC/PB	Input VR maximum
5	Record level	Fig. 2	1KHz		REC PAUSE	AC voltmeter	Attenuator or AF OSC output	350mV	accu VR center position
					REC/PB	AC voltmeter	R-401 (Ch.L) R-402 (Ch.R)	Same level at REC/PB	

ACCU BIAS oscillator adjustment

1. Connect the oscilloscope and AC votmeter to the terminal TP-3.
2. Pull P605 socket out of P605 plug on NACOC-2673.
3. Connect +5V terminal to the kathode of D-618 with short-crip.
4. Adjust the semi-fixed resistor R-531 so that the 400Hz and 12kHz mixing signals become same level (a=b) as shown below.
5. Adjust R-532 so that the AC voltmeter indicator becomes 20mV.



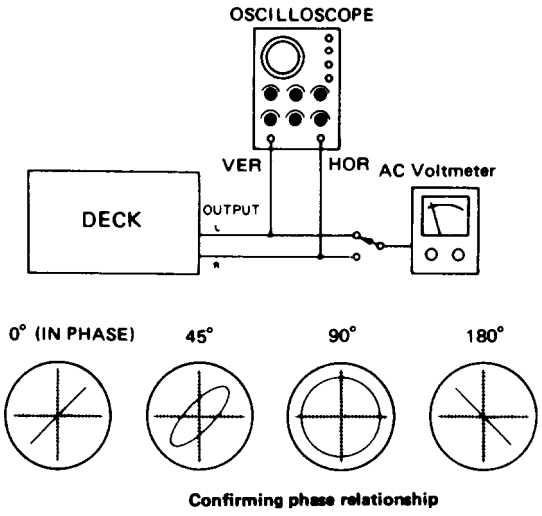


fig-1

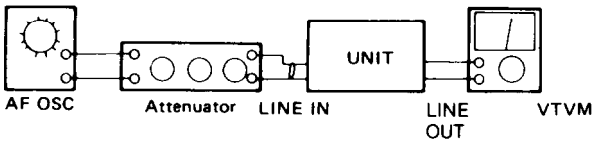
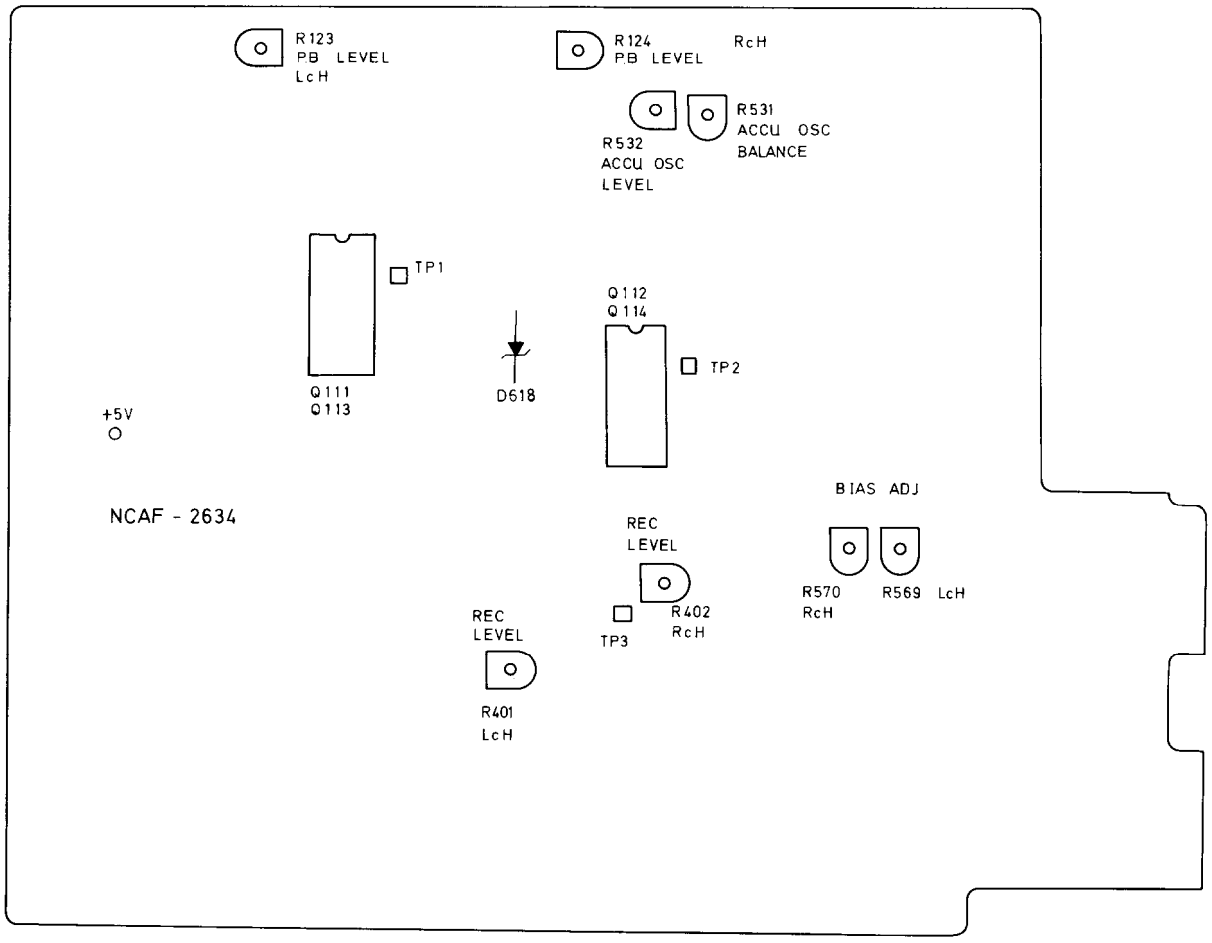


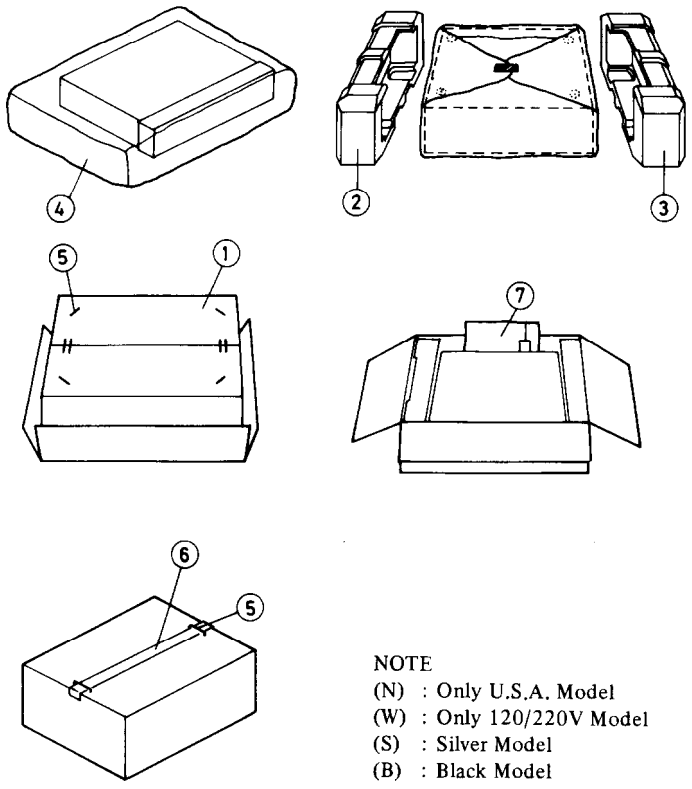
fig-2

PLAY torque ..... 30 ~ 60 g/cm
FF. REW torque ..... 70 ~ 140 g/cm

Back tention ..... 4 ~ 7 g/cm



PACKING VIEW



NOTE
(N) : Only U.S.A. Model
(W) : Only 120/220V Model
(S) : Silver Model
(B) : Black Model

D Model

REF. NO.	PART NO.	DESCRIPTION
1	29051302	Master carton box (S)
	29051304	Master carton box (B)
2	29090770A	Pad (L)
3	29090769B	Pad (R)
4	29100037A	650x500 Poly bag
	29095012-1	500x800 Protection sheet (B)
5	282301	Sealing hook
6	260012	Damplon tape
7	Accessary bag ass'y	
	29340998	Instruction manual
	2010095	Connection cable
	29365006-7	Waranty card (N)
	29358002C	Service station list (N)
	29100006A	350x250 Poly bag

G/W Model

REF. NO.	PART NO.	DESCRIPTION
1	29051302	Master carton box (S)
	29051304	Master carton box (B)
2	29090770A	Pad (L)
3	29090769B	Pad (R)
4	29100037A	650x500 Poly bag
	29095012-1	500x800 Protection sheet (B)
5	282301	Sealing hook
6	260012	Damplon tape
7	Accessary bag ass'y	
	29340999	Instruction manual
	2010095	Connection cable
	25055018	Conversion plug (CV-K-2) (W)

PRINTED CIRCIUT BOARD PARTS LIST

Control pc board (NACOC–2637–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q701	222777	LM6402H–425
Q702	222776	LM6402H–424
Q703	222810	LC7800
Q704	222639 or	LB1275 or
	222865	BA12004
Q705	222840241	4024BP
Q706	222840692 or	4069BP or
	222934	BU4069UB
Q719, Q720	222953	M54544AL
	Transistors	
Q707–Q709	2211454 or	2SA1015Y or
	2212494	JA101P
Q710, Q711,	2211255,	2SC1815GR,
Q715–Q717	2210746 or	2SC945AP or
	2212485	JC501Q
Q712, Q714	2211454 or	2SA1015Y or
	2212494	JA101P
Q713, Q718	2201540	2SD947
Q721	2201074 or	2SD880Y or
	2201385	2SD330E
Q727–Q733	2211454 or	2SA1015Y or
	2212494	JA101P
Q735–Q738	2211706	2SD655F
Q739	2211544	2SC1959Y
Q740, Q741	2211454 or	2SA1015Y or
	2212494	JA101P
Q744–Q746	2211255,	2SC1815GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
	Diodes	
D701	223155	1SS138
D705–D707	223155	1SS138
D727	223155	1SS138
D725	2239593,	RD10EB3,
	2242885 or	EQA02–10B or
	2243213	MTZ10C
	Ceramic osc.	
X701	3010069	CSB800A
	Lamp	
PL902	210190	14V, 60mA
	Capacitors	
C701	354750479	4.7μF, 25V, Elect.
C702–C704	354780109	1μF, 50V, Elect.
C705	354784799	0.47μF, 50V, Elect.
C706	354741009	10μF, 16V, Elect.
C712	354732209	22μF, 10V, Elect.
C715	354734709	47μF, 10V, Elect.
C718	354781599	0.15μF, 50V, Elect.
C723–C725	354781099	0.1μF, 50V, Elect.
	Resistors	
R701–R711	49163392411	3.9kΩx11, 1/10W, Network
R713–R716	49163392404	3.9kΩx4, 1/10W, Network
R726–R731	49163392406	3.9kΩx6, 1/10W, Network
R732–R742	49163392411	3.9kΩx11, 1/10W, Network
R743–R746	49163392404	3.9kΩx4, 1/10W, Network
R785–R796	49163392412	3.9kΩx12, 1/10W, Network
R814–R817	49163392404	3.9kΩx4, 1/10W, Network
R763	441723904	39Ω, 2W, Oxidefilm
	Pluge	
P603	25055132	NPLG–2P116
P604	25055133	NPLG–3P117
P605	25055135	NPLG–5P119
P701	25055140	NPLG–10P124
P702	2000548	NSAS–18P504, Mecha socket
P703	25055191	NPLG–10P–175
P704–P707	25055185	NPLG–4P–169
P708	25050290	NSCT–6P98, socket

Display pc board (NADIS–2638–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Diode	
D603, D604	223155	1SS138
	Leds	
D605, D610	225178	GL3HY28
D606, D710	225179	GL3NG28
D611, D612	225179	GL3NG28
D617, D709	225178	GL3HY28
D708, D712	225177	GL3PR28
D711	225178	GL3HY28
D713, D714	225178	GL3HY28
D718, D724	225179	GL2NG28
	Switch	
S601–S605	25035523	NPS–122–L485, Push
S710–S718	25035389	NPS–111–S353, Push
	Holder	
	27190448	Holder (LED–16)
	27190449	Holder (LED–4)

Operation switch pc board (NASW–2639–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	Leds	
D715	225134	GL3WG1
D716, D717	225126	GL3PR1
	Switch	
S701–S709	25035389	NPS–111–S353, Push
	Socket	
P703A	2000400	NSAS–20P359
P704A	2000515	NSAS–8P471
	Holder	
	27190447	Holder (LED–3)

Remote control pc board (NARM–2640–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P703	25050070	NSCT-7P20, Socket

Timer switch pc board (NASW–2641–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S712	25030277A	NRS–225–20MP, Switch
P709	25050270	NSCT–6P98, Socket

Display pc board (NALED–2642–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D726	225176	GL3N412, Led
P705A	2000570	NSAS–8P526, Socket
P706A	2000571	NSAS–8P527, Socket
P707A	2000572	NSAS–8P528, Socket

Power switch pc board (NAPS–2664–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
C901	3500065A	0.01μF, 400V, Capacitor IS

PRINTED CIRCUIT BOARD–PARTS LIST

Main circuit pc board (NAAF–2634–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs	
Q107–Q110	222811 or	NJM4558DD or
	222502	NJM4558DX
Q111–Q114	222958	HA12090NT
Q125, Q126	222811 or	NJM4558DD or
	222502	NJM4558DX
Q301, Q302	222652	M5218L
Q403, Q404	222808	M5218P
Q409, Q410	222959	μPC1297CA
Q415	222918	BA6251
Q501, Q502	222465,	NJM4558D,
	222808 or	M5218P or
	222921	BA4558
Q503, Q506,	222681 or	IR3702 or
Q510–Q517	222695	LA6324
Q601, Q602	222840661 or	4066BP
	222933	BU4066B
Q901	222780120	7812
Q902	222790122	79M12
Q903	222780050	7805
	Transistors	
Q101–Q104	2211896 or	2SC1815LBL or
	2211406	2SC2240BL
Q105, Q106,	2211255,	2SC1815GR,
Q115, Q116	2210746 or	2SC945AP or
	2212485	JC501Q
Q117, Q118	2211706,	2SD655F,
	2211705,	2SD655E,
	2212793,	2SD1468Q,
	2212794 or	2SD1468R,
	2212795	2SD1468S
Q119, Q120	2212304,	2SK381D, (G/W)
	2212305,	2SK381E,
	2211945 or	2SK246GR or
	2211946	2SK246BL
Q121–Q124	2211896 or	2SC1815BL or (G/W)
	2211406	2SC2240BL
Q303, Q304,	2211255,	2SC1815GR,
Q401, Q402	2210746 or	2SC945AP or
	2212485	JC501Q
Q405–Q408	2212304,	2SK381D,
	2212305,	2SK381E,
	2211945 or	2SK246GR or
	2211946	2SK246BL
Q411	2211454 or	2SA1015Y or
	2212494	JA101P
Q412	2211255,	2SC1815GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
Q413	2211454 or	2SA1015Y or
	2212494	JA101P
Q414	2201540	2SD947
Q507–Q509	2211255 or	2SC1815GR or
	2210746	2SC945AP
Q518, Q519	2211255,	2SC1815GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
Q603, Q607,	2211454 or	2SA1015Y or
Q610–Q613	2212494	JA101P
Q604	2211255,	2SC1815GR, (G/W)
	2210746 or	2SC945AP or
	2212485	JC501Q
Q605, Q606,	2211255,	2SC1815GR,

CIRCUIT NO.	PART NO.	DESCRIPTION
Q608, Q609	2210746 or	2SC945AP or
	2212485	JC501Q
Q904	2201074 or	2SD880Y or
	2201385	2SD330E
Q905	2211255,	2SC1815GR,
	2210746 or	2SC945AP or
	2212485	JC501Q
	Diodes	
D101, D102	223155	1SS138
D301, D302	223132	1K60
D303, D304	223155	1SS138
D305, D306	223848	GP07B
D307–D310	223155	1SS138
D401–D407	223155	1SS138
D501–D504	223155	1SS138
D505	2239472,	RD5.6EB2,
	2243152 or	MTZ5.6B or
	2242824	EQA02–06A
D506	223150,	US1040,
	223124 or	1S2473 or
	223145	1S2076TD
D507–D510	223132	1K60
D511	223155	1SS138
D512	2239451,	RD5.1EB1,
	2242836 or	EQA02–05C or
	2243141	MTZ5.1A
D601	223132	1K60
D602	223155	1SS138
D607, D608	223155	1SS138 (G/W)
D609	2239673,	RD15EB3,
	2242722 or	EQA02–14B or
	2243253	MTZ15C
D613, D614	223150,	US1040,
	223124 or	1S2473 or
	223145	1S2076TD
D615, D616	223155	1SS138
D901	223862 or	WL01 or
	223890	W01RL
D902	223868 or	2W02 or
	223889	RC202
D903	2239671,	RD15EB1,
	2242912 or	EQA–02–13B or
	2243251	MTZ15A
D904	223842 or	GP15B or
	223891	RL152
D905, D906	223155	1SS138
	Coils	
L101, L102	231099	NCH–6146
L103, L104	233245	NCH–2029
L105, L106	231077 or	NCH–2125 or
	231025	NCH–1064
L107, L108	231103	NMC–6149
L109, L110	233245	NMC–2029
L111, L112	231077,	NCH–2125,
	231025 or	NCH–1046 or
	233188	NCH–1033
L401, L402	231089 or	NCH–2137 or
	231044	NCH–2084
L403–L406	231084 or	NCH–2132 or
	231039	NCH–2079
L407, L408	231101	NCH–2148
L109, L110	231100	NCH–4147
Z401	24606198	NOB–029

CIRCUIT NO.	PART NO.	DESCRIPTION
	Capacitors	
C101, C102	392880337	3.3μF, 50V, LL.
C107, C108	354741009	10μF, 16V, Elect.
C111, C112	354742209	22μF, 16V, Elect.
C119, C120	354783399	0.33μF, 50V, Elect.
C121, C122	354741009	10μF, 50V, Elect.
C125, C126	354780109	1μF, 50V, Elect.
C129, C130	354786899	0.68μF, 50V, Elect.
C131, C132	354780229	2.2μF, 50V, Elect.
C139, C140	354786899	0.68μF, 50V, Elect.
C141, C142	354780229	2.2μF, 50V, Elect.
C143, C144	354741009	10μF, 16V, Elect.
C145, C146	354780109	1μF, 50V, Elect.
C147, C148	354741009	10μF, 16V, Elect.
C149, C150	354741009	10μF, 16V, Elect.
C153, C154	354780109	1μF, 50V, Elect.
C157, C158	354786899	0.68μF, 50V, Elect.
C159, C160	354780229	2.2μF, 50V, Elect.
C167, C168	354786899	0.68μF, 50V, Elect.
C169, C170	354780229	2.2μF, 50V, Elect.
C171, C172	354741009	10μF, 16V, Elect.
C173–C176	354742219	220μF, 16V, Elect.
C177, C178	354780109	1μF, 50V, Elect. (G/W)
C179, C180	354780109	1μF, 50V, Elect. (G/W)
C181, C182	354783399	0.33μF, 50V, Elect.
C185, C186	354780109	1μF, 50V, Elect.
C301, C302	354741009	10μF, 16V, Elect.
C303, C304	354780339	3.3μF, 50V, Elect.
C401, C402	354741009	10μF, 16V, Elect.
C403, C404	354782299	0.22μF, 50V, Elect.
C405, C406	354750479	4.7μF, 25V, Elect.
C409, C410	354780339	3.3μF, 50V, Elect.
C431, C432	370131014	100PF, 100V, APS.
C433, C434	370134714	470PF, 100V, APS.
C438	354741009	10μF, 16V, Elect.
C439	354732219	220μF, 10V, Elect.
C501	354782299	0.22μF, 50V, Elect.
C503	354741009	10μF, 16V, Elect.
C504	354786899	0.68μF, 50V, Elect.
C508	354780339	3.3μF, 50V, Elect.
C509	354741009	10μF, 16V, Elect.
C513, C514	354741009	10μF, 16V, Elect.
C515	354750479	4.7μF, 25V, Elect.
C516	354741009	10μF, 16V, Elect.
C519	354780109	1μF, 50V, Elect.
C520	354742209	22μF, 16V, Elect.
C523	354741009	10μF, 16V, Elect.
C524	354742209	22μF, 16V, Elect.
C525	354782299	0.22μF, 50V, Elect.
C603, C604	354742209	22μF, 16V, Elect.
C605	354750479	4.7μF, 25V, Elect.
C606	354780109	1μF, 50V, Elect.
C904	354741009	10μF, 16V, Elect.
C905	352751029	1000μF, 25V, Elect.
C906	354752229	2200μF, 25V, Elect.
C907, C908	354783399	0.33μF, 50V, Elect.
C909, C910	354745709	47μF, 25V, Elect.
C911	352751029	1000μF, 25V, Elect.
C912	354752229	2200μF, 25V, Elect.
C913	354754709	47μF, 25V, Elect.
C914	3504168	13000μF, 25V, Elect.
C915	354783399	0.33μF, 50V, Elect.
C916	354782299	0.22μF, 50V, Elect.
C917	354754709	47μF, 25V, Elect.
C918	354754709	47μF, 25V, Elect.
C919, C920	354744719	470μF, 16V, Elect.
C922	354741009	10μF, 16V, Elect.
C923	354742219	220μF, 16V, Elect. (G/W)
C924	354780109	1μF, 50V, Elect.
C925	354754709	47μF, 50V, Elect.
	Resistors	
R123, R124	5215046	N08HR50KBC, Semi-fixed
R401, R402	5215044	N08HR5KBC, Semi-fixed
R531	5215047	N08HR100KBC, Semi-fixed
R532	5215018	N08HR1KBC, Semi-fixed
R569, R570	5215045	N08HR10BC, Semi-fixed
R199	5104184	N09RL1C250KWT20M, Variable
R901	441721004	10Ω, 2W, Oxidefilm
R902	441524794	0.47Ω, 1/2W, Oxidefilm
	Pluge	
P101, P104	25055134	NPLG–4P118
P402	25055132	NPLG–2P116
	Terminals	
P105	25045120	NPJ–3PDBL49
P103	25045195	HLJ–433B–01–3010
	Socket	
P104	25050064	NSCT–5P18, DIN (G/W)
P403	25050267	NSCT–3P95
P404	25050270	NSCT–6P98
P601	25050268	NSCT–4P96
P602	25050270	NSCT–6P98
P603	2000547	NSAS–4P503
P604	2000396	NSAS–6P355
P605	2000397	NSAS–10P356
	Switch	
S501	25030277A	NRS–225–20MP, ACCU,
	Screw	
	831430088	3TTW+8B (BC)
	82143010	3P+10FN (BC)
	223019	AC–229, TR specer
	223017	AC–310, Bushu
	27225077	Shield plate

Peak meter and volum pc board (NAVR–2635–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
	IC	
Q305	222507	TA7612AP
	LEDS	
D311, D312	225160	SEL9520BG
D313, D314	225161	SEL9520MB01
	Lamp	
PL901	210090	14V, 150mA
	Resistors	
R197, R198	6172001	N60LGL50KA5Z
	27225076	Shield plate

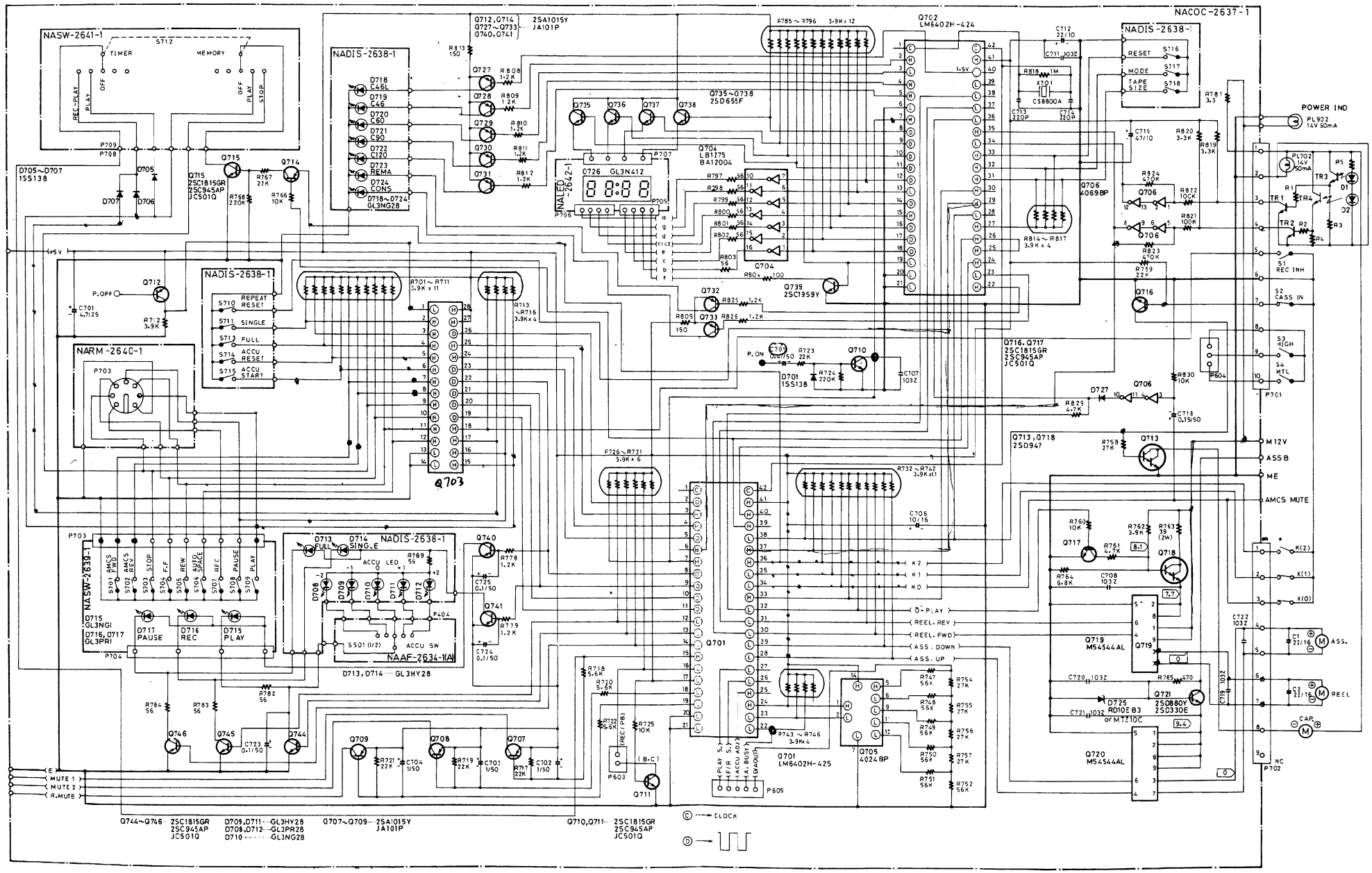
Headphone Terminal pc board (NAHP–2636–1)

CIRCUIT NO.	PART NO.	DESCRIPTION
P301	25045139	HLJ0540–01–010

NOTE
(D) : Only 120V model
(G) : Only 220V model
(W) : Only Universal model
(S) : Silver model
(B) : Black model

SCHEMATIC DIAGRAM-AMPLIFIER SECTION

SCHEMATIC DIAGRAM-CONTROL SECTION



BLOCK DIAGRAM